PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
P27091PC00/RKI/EOF		

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/NL2003/000928	18.12.2003	18.12.2003

International Patent Classification (IPC) or both national classification and IPC
B01J37/00

Applicant
AVANTIUM INTERNATIONAL B.V. et al.

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
15.07.2005	13.02.2006

Name and mailing address of the international preliminary examining authority:

European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Holzwarth, A

Telephone No. +49 89 2399-7269

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL2003/000928

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-9 as originally filed

Claims, Numbers

1-10 received on 19.01.2006 with letter of 19.01.2006

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-5
	No:	Claims	6-10
Inventive step (IS)	Yes:	Claims	
	No:	Claims	6-10
Industrial applicability (IA)	Yes:	Claims	1-10
	No:	Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1: EP-A-0 895 809 (ASAHI CHEMICAL IND) 10 February 1999 (1999-02-10)
D2: US 2002/115879 A1 (HINAGO HIDENORI ET AL) 22 August 2002 (2002-08-22)
D3: EP-A-1 358 932 (ROHM & HAAS) 5 November 2003 (2003-11-05)

1. The present application does not meet the criteria of Article 33(1) PCT, because of the following reasons:

1.1 D1 (paragraphs [0001], [0093], [0098]-[0109]; example 1), **D2** (paragraphs [0002], [0170]-[0183], examples) disclose Mo-V-Te-Nb catalysts, which are prepared by preparation procedures according to claim 1, but using colloidal silica as inert carrier material. As the example section does not provide any evidence that there is an advantage in using silica in a powdery form (**no catalytic data can be found in table 1 of the present application for comp. Ex. 1, where Ludox colloidal silica was used**), no inventive step can be recognized. **Furthermore from claim 4 it is clear that the silica used in the present invention can have particle sizes in the range of the colloidal silica precursors used in D1 and D2.** The catalysts in D1 and D2 are used for the preparation of (meth)acrylic acid or (meth)acrylonitrile by catalytic oxidation or ammoxidation of propane or isobutane and a person skilled in the art knows that they are also suitable for the preparation of acetic acid from ethane (see also D3).

D3 (examples 1,7; paragraphs [0001], [0036] - [0040]) discloses Mo-V-Te-Nb catalysts, which are prepared by physical mixing of the carrier materials with the calcined Mo-V-Te-Nb mixed oxide or by washcoating of the calcined Mo-V-Te-Nb mixed oxide onto a monolithic support. As the example section does not provide any evidence that there is an advantage in introducing the carrier material into the precursor slurry before calcination, no inventive step can be recognized. The catalysts of D3 are said to be suitable for the preparation of carboxylic acids and nitriles from alkanes.

Therefore the subject-matter of at least claim 1 does not involve an inventive step in the sense of Article 33(3) PCT in view of D1-D3.

1.2 The Applicant's attention is drawn to the fact that claim 6 is a "product-by-process" claim. A new process does not automatically lead to a new product; consequently, should the applicant maintain any product-by-process claim he is requested to give evidence (eg. by means of comparative tests) that the product thus claimed is novel an inventive. At present it is not clear what the difference of a catalyst according to claim 6 is, compared to a catalyst according to the prior art as disclosed in D1-D3.
Therefore the subject-matter of the claim 6 is not new in the sense of Article 33(2) PCT in view of D1-D3.

1.3 The catalyst of claim 6 is not novel and the uses mentioned in the claims 7-10 are already disclosed in D1-D3 or are known to a person skilled in the art (see under 1.1).
Therefore the subject-matter of the claims 7-10 is not new in the sense of Article 33(2) PCT in view of D1-D3.

1.4 Dependent claims 2-5 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT with respect to inventive step, because said additional features are either disclosed in the prior art documents (see above) or are trivial or within the competence of a skilled person looking for alternative catalysts or processes.

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(44)

Amended claims

1. Method for the preparation of Mo-V-Te-Nb catalyst comprising the steps of:
   a) preparing a slurry comprising ionic species of Mo, V, Te and Nb and an inert carrier by combining the inert carrier in the form of a powder ~~ceramic form~~ with one or more solutions comprising the above metal ionic species;
   b) drying of the slurry to obtain a particulate product;
   c) precalcining the dried particulate product at a temperature of 150-350°C in an oxygen-containing atmosphere;
   d) calcining the precalcined dried particulate product at a temperature of 350-750°C in an inert atmosphere to obtain the catalyst.

2. Method according to claim 1 wherein the drying is performed by spray-drying, the spray-drying preferably being performed at a temperature of 100-250°C.

3. Method according to any of the preceding claims, wherein the calcining is conducted in an argon or nitrogen atmosphere.

4. Method according to any of the preceding claims, wherein the ceramic inert carrier has a mean particle size of 0.1-100 nm.

5. Method according to any of the preceding claims, comprising an additional step e) of processing the catalyst of step d) to catalyst particles having a size of 0.1-5 mm.

6. Mo-V-Te-Nb catalyst obtainable by the method of any of the preceding claims.

7. Use of a catalyst according to claim 6 for the preparation of acrylic acid or acrylonitrile by catalytic oxidation or ammoxidation, respectively, of propane.

8. Use of a catalyst according to claim 6 for the preparation of methacrylic acid or methacrylonitrile by catalytic oxidation or ammoxidation, respectively, of isobutane.

9. Use of a catalyst according to claim 6 for the preparation of acetic acid by catalytic oxidation of ethane.

10. Use according to any of claims 7-9, wherein the oxidation or ammoxidation is conducted in a fixed bed reactor.